

# Peter Donebauer, Richard Monkhouse and the Development of the EMS Spectron and the Videokalos Image Processor

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## ABSTRACT

The author details the development of two early color video synthesizers, the EMS Spectron and the Videokalos Image Processor, and examines their influence on video-based art. The Spectron, developed by Richard Monkhouse for Electronic Music Studios, influenced both its creator and various artists in the development of video-based art and images. Artist Peter Donebauer collaborated with Monkhouse to produce the Videokalos, leading to several artworks and a series of live performances.

In the early days of video art, many artists were involved in the design of hardware specifically for the development of their own creative practices. Although most of these artists, such as Eric Siegel, Stephen Beck and Nam June Paik [1], were based in the United States, a number of individuals were engaged in comparable activities in Britain during the early 1970s. Richard Monkhouse and Peter Donebauer were among the most significant of these British pioneers in video technology.

## RICHARD MONKHOUSE AND THE EMS SPECTRON

Richard Monkhouse did not train as an artist. He graduated with a master's degree in natural sciences from Cambridge University in 1972 and then worked on government defense projects at Marconi-Elliott Avionic Systems, where he learned how to design and build electronic circuits. He subsequently joined Electronic Music Studios Ltd. (EMS), a London-based company specializing in the manufacture of sound synthesizers. One of Monkhouse's first projects at EMS involved the design of the video display component for a new audio instrument. Intrigued by the visual quality and purity of the color images he was able to produce with the video display, Monkhouse developed a prototype video synthesizer that went much further than simply generating colored stripes and squares.

Monkhouse's prototype, initially named the Spectre (Fig. 1), generated considerable interest at EMS and soon attracted the interest of EMS director and electronic music composer Peter Zinovieff [2]. Among numerous other functions, the machine could take a monochrome video camera feed and colorize the image to eight levels of luminance, with digital control of color, hues or chrominance. After a number of technical demonstrations in the United Kingdom, EMS added a color encoder to the Spectre, enabling recordable output.

For the basic layout and configuration of his video synthesizer, Monkhouse drew on the design of the EMS VCS 3 audio synthesizer, which featured a pin-based patch board, giving the instrument considerable flexibility by facilitating countless routing possibilities without the need to resort to an enormous patch field of video connectors.

In the December 1974 issue of *Video and Audio-Visual Review*, a full-color image produced by the Spectre appeared on the cover, and the magazine contained a substantial article written by Monkhouse, entitled "The Moving Art of Video Graphics—Or How to Drive a Spectre" [3]. Comprehensively illustrated with images and diagrams, the six-page article presented the functions and operations of the prototype Spectre in considerable detail. Monkhouse also outlined the basic philosophy and approach behind the design of his instrument:

Up to now there has been little work on direct video synthesis—most effects units (such as wipe generators, chromakey units, and colourizers) have been kept separate, and only used directly to treat signals that originate from a conventional camera scene set up. In our Spectre video synthesizer, a different concept has been used; rather than produce another special effects unit I have endeavored to group together units with a highly perceptual impact in a way that gives total freedom to combine shapes and colours logically, and in a very general way [4].

Although the Spectre was a novel idea with an untested market, EMS manufactured and actively promoted the instrument, renaming it the Spectron and making it available for £4,500 in 1975 (Fig. 2). Monkhouse, working for EMS as an electronics engineer employed to develop the new prototype, was not simply interested in the technology for its own sake; he also wanted to make creative use of the machine he had designed. He left EMS in 1975, but even before that had begun to use the Spectron to produce his own video work. Initially inspired by the computer films of John and James Whitney, the idea to work with video as a creative medium did not occur to Monkhouse until he built the encoder for the Spectron. Around this time cheaper color video recorders became available in the United Kingdom, and this further impetus enabled Monkhouse to begin producing his own video work, including experimentation with video feedback, 16mm film loops of computer graphics displays and oscilloscope patterns, cutting his images to pre-recorded music tracks (Color Plate B).

The Spectron inspired other video artists as well. French video artist Robert Cahen systematically explored the capabilities of the Spectron in a series of videotapes he made in the late 1970s and early 1980s while working at the Institut Na-

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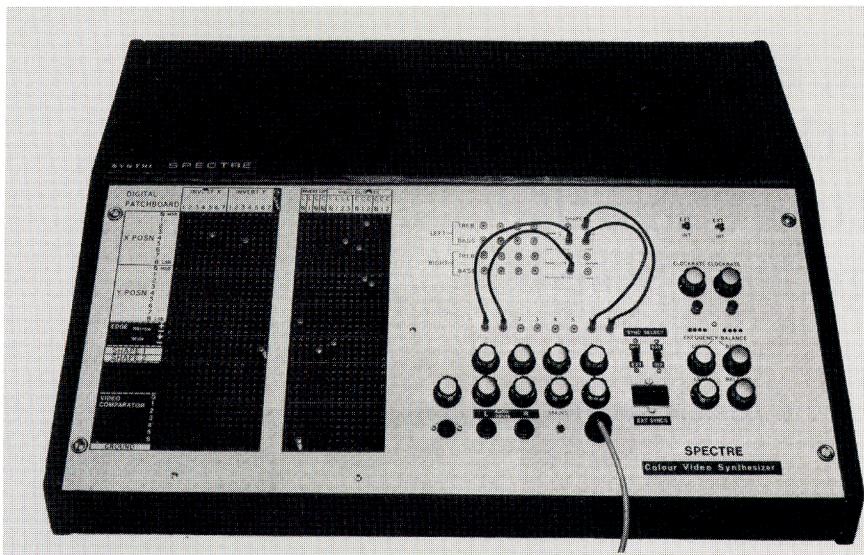


Fig. 1. EMS Prototype Spectre. (Photo © Robin James Wood)

tional de l'Audiovisuel (INA) in Paris, producing works such as *Sans titre* (1977), *L'Eclipse* (1979), *Trompe-l'oeil* (1979) and *Nuage noir* (1982). Cahen was especially interested in the Spectron's capacity to generate an electronic weave of imagery to produce a kind of "curtain that gives a craving to see what is hidden behind" [5]. In fact, at this time Cahen was so entranced with the machine and its capabilities that his colleagues at INA dubbed him "Spectroman"! [6]

Images of and from the Spectron also feature in Chris Marker's 1982 film *Sans Soleil*. The film presents images of a fictional Japanese video artist operating the controls of a synthesizer that is unmistakably a Spectron, with close-ups of the distinctive pin boards and the British spelling of the word "colour" on the control panel. The voice-over comments on the complex relationship between the artist and his machine: "I look at his machine. I think of a world where each memory can create its own legend."

### PETER DONEBAUER AND THE VIDEOKALOS IMAGE PROCESSOR

In addition to this impact on a number of significant French artists, Richard Monkhouse's work with the Spectron also caught the attention of an artist working closer to home.

In 1974 video artist Peter Donebauer, interested in Monkhouse's approach to the design of the Spectron, visited him at the EMS offices in south London. This initial meeting marked the beginning of a collaboration that lasted many years and included the building of several

video instruments and a tour of live video/music performances.

With the intention of finding a way to continue the abstract video work he had produced using the color television studio at the Royal College of Art (RCA) as a student, Donebauer sought to develop a video instrument that drew on some aspects of the Spectron. Essentially he wanted a compact, affordable camera processing instrument that combined some of the basic features of a conventional studio video mixer with a multiple colorizer, plus a synchronizer pulse generator and encoding/decoding circuits. Donebauer and Monkhouse agreed to work together to design and build such

an instrument, pooling ideas and expertise.

Prior to his meeting with Monkhouse, Donebauer's concern had been to develop video work that explored and established relationships between music and visual phenomena. Inspired by Theodore Schwenk's [7] "drop picture technique" for photographing the surface patterning of water, Donebauer initially worked with a Portapak to record video images derived from a homemade device to vibrate a thin film of water over a loudspeaker. These preliminary black-and-white "sketches" formed the basis of the more ambitious work that followed.

Forming a collaborative partnership with musician Simon Desorgher, Donebauer began working in the television studio at RCA to explore parallels between electronic music and color video. These collaborations, based on notions of live feedback and improvisation between video artist and musician, attempted to produce visual work composed from abstract natural forms using music as a model. One of the most significant aspects of video for Donebauer was its immediacy—he saw a direct analogy between performing with a musical instrument and his working process with live video. Donebauer developed a method of producing a real-time continuous recording that recorded or documented a collaborative performance, with the final tape produced by this method selected from the best take.

Early in 1974 BBC television commissioned Donebauer to produce a new

Fig. 2. EMS Production Spectron. (Photo © Robin James Wood)





Fig. 3. Peter Donebauer during a live broadcast for the BBC TV show "Second House," 1974. (© Peter Donebauer)

videotape for broadcast on "Second House," an arts program. The commissioned tape, entitled *Entering*, recorded on 15 April and broadcast in May 1974 (Fig. 3), was the first British artist's videotape to be transmitted nationally. David Hall's *TV Pieces*, broadcast by Scottish TV as part of the 1971 Edinburgh Festival, was shot on 16mm film and only transmitted within the STV region. In May 1975 BBC television re-broadcast *Entering* as part of its arts program "Arena," to coincide with The Video Show at the Serpentine Gallery—the United Kingdom's first and most important comprehensive exhibition of video, including tapes, performance and installation.

BBC studios of the day were designed with engineering and camera controls in separate locations, and this configuration was not well suited to Donebauer's working methods. The BBC decided to transmit his work via an outside broadcast microwave link from the television studio at RCA. This first taste of the flexibility and ephemerality of video had a deep effect on Donebauer's sense of the medium and on the subsequent development of his work. This experience of the fluid electronic signal as the defining element of the medium led directly to the development of Donebauer's own video processing instrument.

After graduation from RCA, Donebauer's solution to his lack of access to the television studio was the development of a video image processing tool, analogous to a sound mixer, but to be used live, like a musical instrument. The Videokalos Image Processor, designed during 1975 in collaboration with Richard

Monkhouse, was intended as a live performance instrument, providing even better real-time control than the television studio (Fig. 4). According to Donebauer, his machine had more precise color mixing capabilities and allowed greater control of video feedback images because the entire unit was self-contained [8]. In the RCA television studio, for example, the vision-mixing console was in a separate room from the engineering control area where Donebauer worked, thus requiring an additional operator. With the Videokalos, Donebauer was finally able to control the entire process by himself.

The Videokalos did not redefine

Donebauer's work, but it did enable him to produce new video work in other locations. The main intention in building the Videokalos was to gain the same level of control as he had had in the studio, but with simpler means. Donebauer also hoped it would bring him into closer contact with the medium: "I felt that getting involved with the integrated circuits, chips and transistors and all the rest of it, would get me closer to the heart of the medium" [9].

Although most of the videotapes Donebauer produced in the period between 1973–1983 were performed live, they were performed, for the most part, without an audience, recorded onto tape to be shown subsequently on a video monitor. The first complete videotape to make use of the Videokalos IMP was *Merging-Emerging* (1978) (Color Plate C). Recording in real time, with no subsequent editing, Donebauer produced *Merging-Emerging* using a procedure in which all the participants—Donebauer, two dancers and two musicians (flute and violin)—had visual and aural feedback that enabled them to modify and adapt their contributions during the recording session. In 1979 Donebauer formed Video and Music Performance (VAMP) with Monkhouse and musicians Simon Desorgher and Lawrence Casserley to present their collaborative work in live performances, touring venues across the United Kingdom (Fig. 5) [10].

Although VAMP's tour was a unique series of events, the live aspect was central to Donebauer's philosophy. His videotapes all derive from live performances,

Fig. 4. Interior of Videokalos prototype, 1976. (© Peter Donebauer)

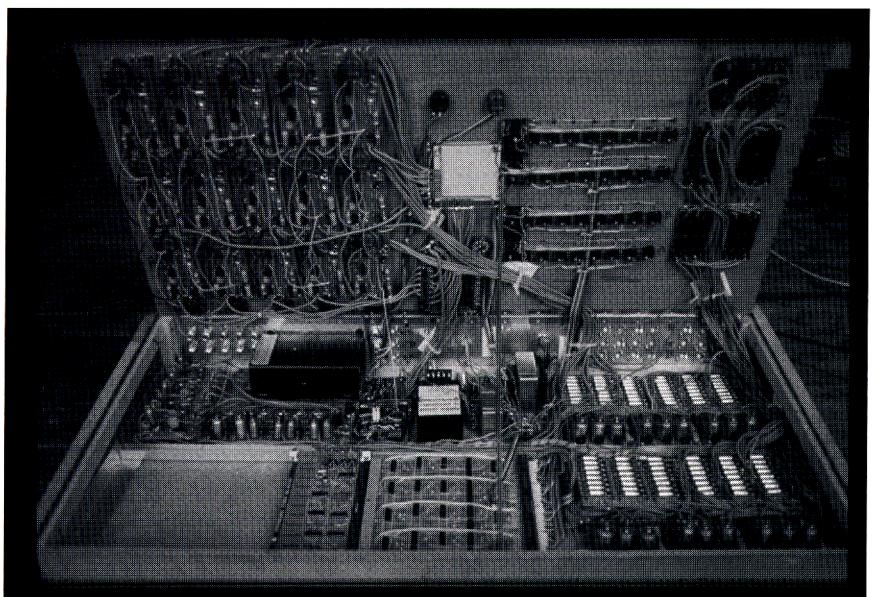




Fig. 5. Peter Donebauer and Richard Monkhouse performing as part of VAMP, at Biddick Farm, Tyne and Wear, England, 1978. (© Peter Donebauer)

the final released version being the best take of a studio recording session. For Donebauer this "liveness" was a key part of the aesthetic, drawn both from the influence of Zen painting and from early television broadcasting. Donebauer's attitude to video was informed by working directly with the medium in a live and interactive way. This attitude is embodied in the Videokalos Image Processor (Fig. 6) and was crucial to both the development of the instrument and to the subsequent development of Donebauer's video work [11]. While the development of the Videokalos did not result in specifically new technology, its unique configuration reflected Donebauer's approach to live video performances and the needs and requirements to facilitate their production.

The instrument's design offered a high degree of flexibility for the synthesis and manipulation of color video imagery. An artist working with the Videokalos could work with up to five independent video inputs, each of which enabled the colorization of monochrome camera sources or the manipulation of the level and gain of the component color sources. Drawing on its EMS heritage, the machine had a 22 x 22 hole pin board used in conjunction with the three key channels, each selectable as a triggering source from any of the monochrome or RGB outputs. It was possible to produce very complex key effects with up to four levels of colorization within a single video image [12].

In 1978 the machine was reviewed in *Broadcast*, a British video trade magazine, and the review describes in detail the syn-

thesizer's functioning and discusses the design philosophy behind it:

The synthesizer represents an essential rethinking of the design and layout of control equipment, incorporates a range of functions normally handled by separate pieces of equipment, and it brings before one operator a range of controls that would in most broadcasting studios be spread out between different operators and locations. . . . clearly the versatility of effects that are possible—and possible under more creative control than previously available—should excite television producers, particularly those interested in exploiting the potential of the studio, and those working on music programmes [13].

Although he was not initially aware of the video work of American pioneers such as Stephen Beck, Eric Siegel or Dan

Sandin [14], Donebauer's work both as an artist and as an electronics designer has much in common with that of his U.S. contemporaries. His interest in the live aspects of video technology and the influences of music and electronic sound synthesizers on the development of his video work and the Videokalos are comparable.

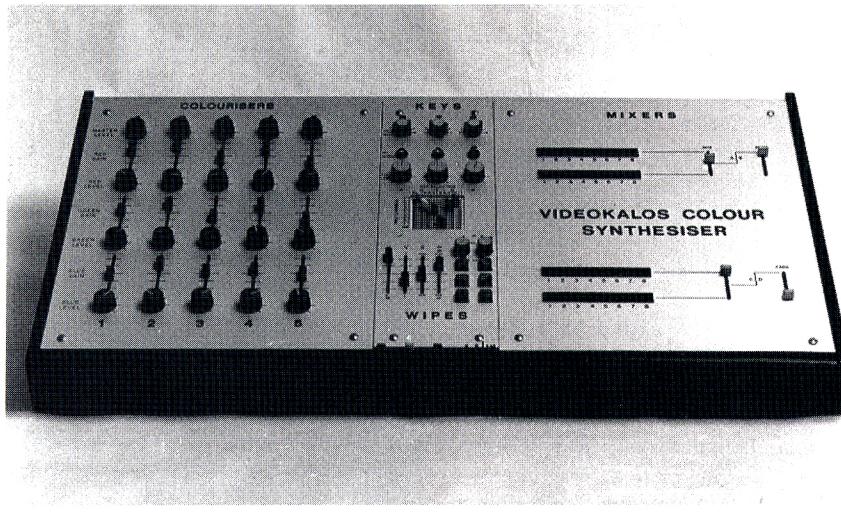
## CONCLUSION

The creative partnership formed by Monkhouse and Donebauer was the stimulus for a number of interdisciplinary projects spanning the fields of electronic and digital imaging, experimental video, collaborative art practice and engineering design. As individuals, they initially approached and defined their creative challenges and design problems from very different perspectives. While Donebauer trained as a visual artist, Monkhouse began his career as a self-taught engineer. The outcomes of their working relationship provide valuable insight into the nature of the affinity between technical innovation and artistic practice [15].

## References and Notes

1. See Gregor Muir, "Past, Present and Future Tense," in special issue "The Tenth New York Digital Salon," *Leonardo* 35, No. 5, 499–500 (2002).
2. After building the first three machines, EMS changed the name to Spectron for "European marketing purposes." In all, EMS built and sold 15 Spectron video synthesizers. (Monkhouse, interview with author, 23 May 2000 <[www.meigh-andrews.com](http://www.meigh-andrews.com)>).
3. Richard Monkhouse, "The Moving Art of Video Graphics—Or How to Drive a Spectre," *Video and Audio-Visual Review* (December 1974) pp. 22–27.
4. Monkhouse [3] p. 22.

Fig. 6. Videokalos Image Processor, production version, 1978. (© Peter Donebauer)



5. Cahen, as quoted in Sandra Lisch, *The Sight of Time: Films and Videos by Robert Cahen* (Pisa, Italy: Edizioni Ets, 1997).

6. Robert Cahen, e-mail to the author, 6 June 2005.

7. See Athena Tacha, "Chaos and Form: A Sculptor's Sources in Science," *Leonardo* 35, No. 3, 239–245 (2001).

8. Donebauer, interview with the author, 8 March 2000, <[www.meigh-andrews.com](http://www.meigh-andrews.com)>.

9. Donebauer [7].

10. The VAMP group consisted of Donebauer, Monkhouse and musicians Desorgher and Casserley. The 1979 tour included venues at Biddick Farm in Tyne and Wear, The Ikon Gallery in Birmingham and the Institute of Contemporary Arts and Intergalactic Arts

in London. Most recently the VAMP group performed once again in front of a live audience, presenting three new works at Tate Britain as part of Analogue: Pioneering Video from the UK, Canada and Poland (1968–1988), 1–2 December 2006, a touring exhibition co-curated by the author.

11. Donebauer's works include *Merging-Emerging* (1978), *In Ernest* (1979), *Performance Pieces* (1979–1980), *Moving* (1980), *Water Cycle* (1981–1982), *Brewing* (1986) and *Mandala* (1991).

12. I have a good working knowledge of the functioning and capabilities of the Videokalos as I have used it extensively for the production of a number of my own early videotapes.

13. Christopher Griffin-Beale, "Colour Me RGB: New Synthesiser Breaks with Tradition," *Broadcast*, 26 June 1978, p. 11.

14. See Daniel J. Sandin et al., "The Artist and the Scientific Research Environment," *Leonardo* 39, No. 3, 219–221 (2006).

15. For further information on the work of Peter Donebauer, see <[www.donebauer.net](http://www.donebauer.net)>.

Chris Meigh-Andrews is Reader in Electronic and Digital Art at the University of Central Lancashire and has been a practicing artist for over 25 years. His videotapes and commissioned and site-specific installations have been exhibited and screened internationally. He is the author of *A History of Video Art: The Development of Form and Function*, published by Berg, Oxford and New York.

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Downloads and file exchanges have altered the economics of music of consumption, but have they also rendered the concert hall obsolete? Or have the isolation of ear buds and the ephemerality of digital files actually served to highlight the social significance and sweaty substantiality of live performance? Or are we witnessing the birth of a new "live," virtually social but vitally sweat-free?

For LMJ 18 we solicit writing on the significance or irrelevance of contemporary performance practice and its alternatives.

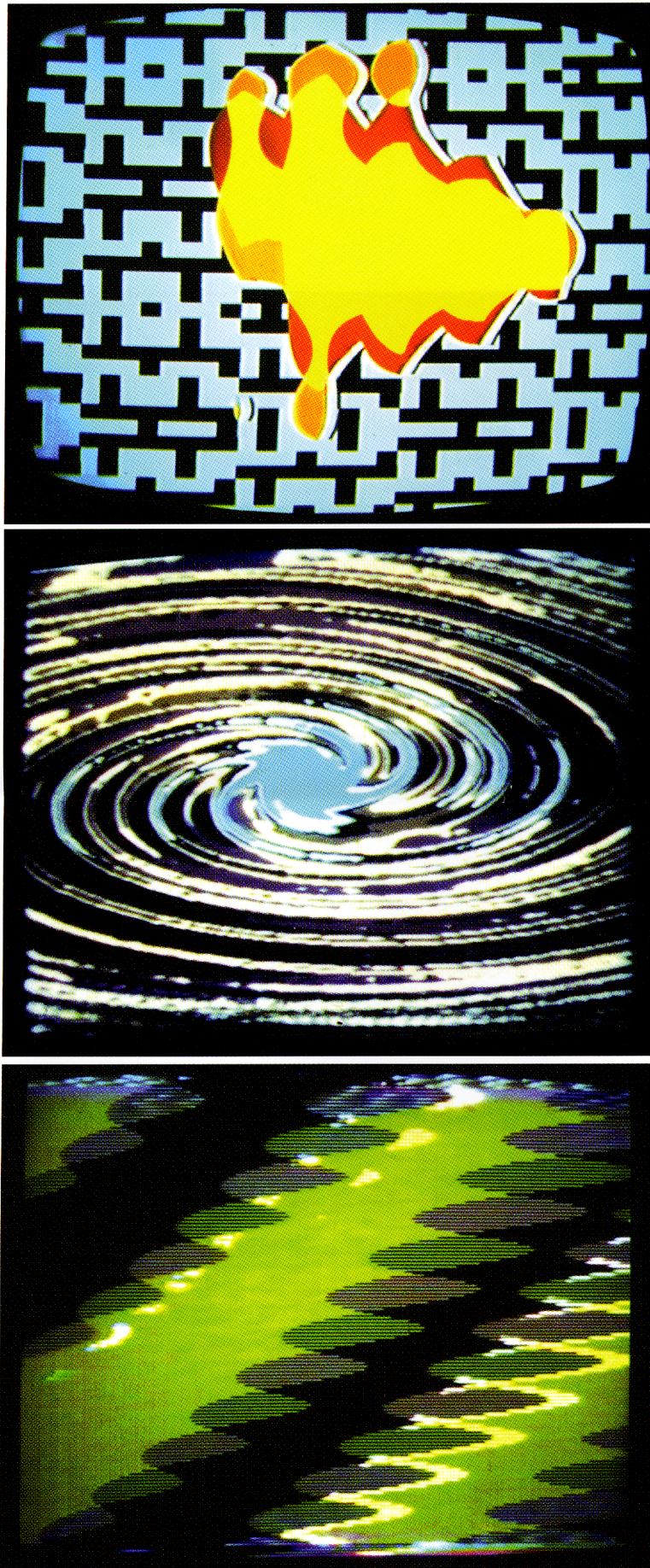
### DEADLINES

**1 October 2007:** Brief proposals sent to Nicolas Collins <[ncollins@artic.edu](mailto:ncollins@artic.edu)>.

**1 January 2008:** Final texts and all materials to the LMJ Editorial Office.

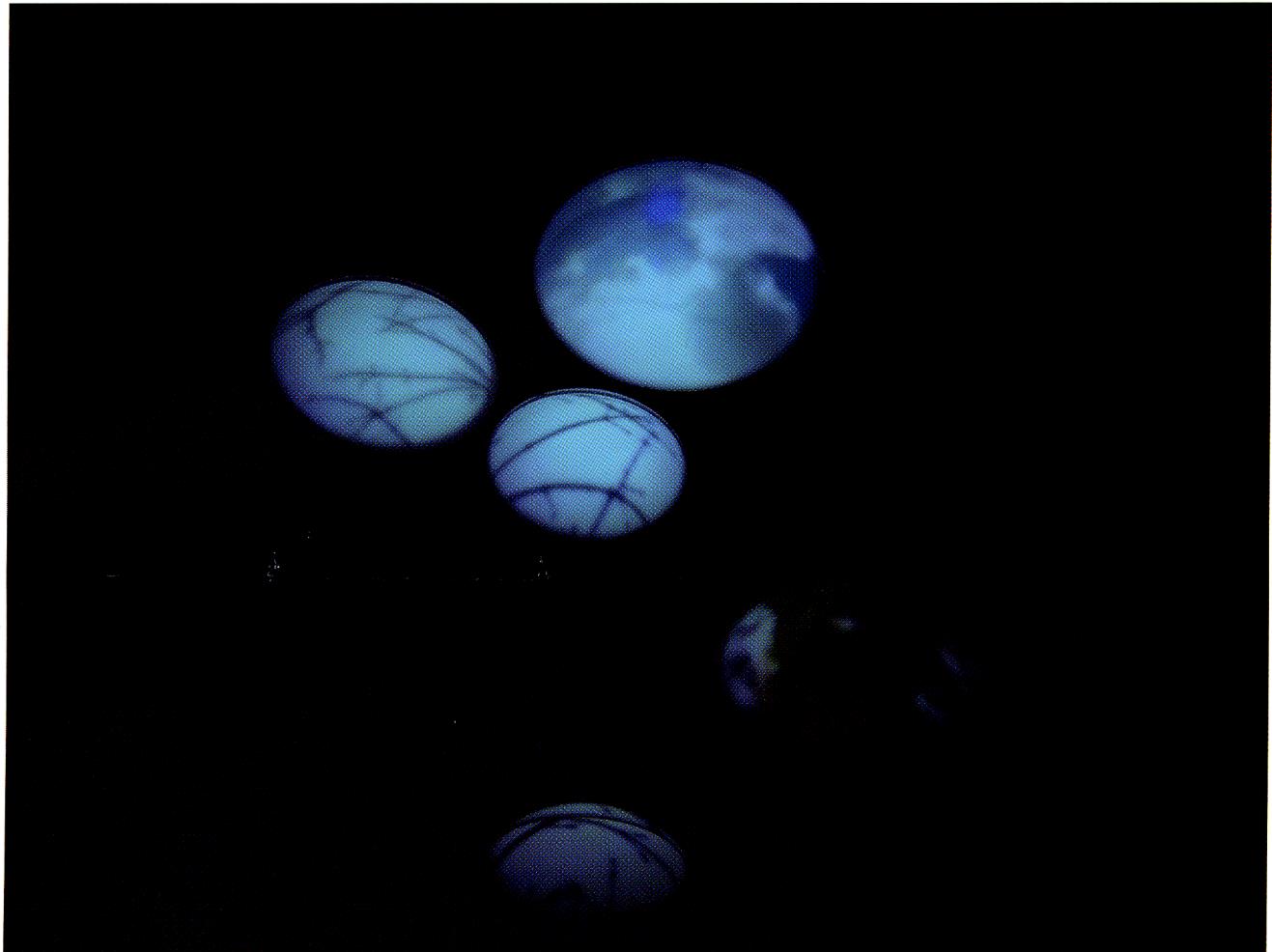
Contact Nicolas Collins <[ncollins@artic.edu](mailto:ncollins@artic.edu)> with any questions.

## COLOR PLATE B



Richard Monkhouse, Spectron sequence. (© Richard Monkhouse) See article by Chris Meigh-Andrews.

## COLOR PLATE A



Janine Randerson, detail of *Anemocinegraph*, video projections, speakers, perspex screens, installed at University of Waikato, 2006.  
© Janine Randerson) The installation uses remote satellite images of New Zealand's weather patterns, surface observations of "eddies" in clouds and water, and sounds from a micro-meteorological weather station.

## COLOR PLATE C

Peter Donebauer, stills from  
Merging-Emerging, 1978.  
(© Peter Donebauer) See article  
by Chris Meigh-Andrews.

